MPS350/4111: Exercises for computer classes

There are several exercises within the lecture notes which require a computer to complete. Many of these provide you with example code and ask you to modify it. You will find this code useful for the project and for re-use in other exercise questions.

You probably won't get through all of the questions listed within each class. Choose which questions you think are best for you.

Class 1:

- Several exercises focus on plotting density functions and mass functions related to Bayesian updates. If you have not already worked through these, you should do this first.

  They are exercises **2.1**, **3.1**, **4.1**, **4.5**.

- Exercise **5.2** gets you do to an elicitation procedure, about your prior beliefs for the maximum temperature tomorrow. Work through this exercise, with a partner (in which case you should both carry out elicitation on each other) or on yourself.

  Do not try to 'improve' your prior beliefs by searching for a weather forecast, or suchlike. This exercise is about eliciting your beliefs – not about how correct/incorrect they are.

  Once you have finished, discuss how well you think the results match your prior beliefs.

Class 2:

- Some of the exercises on Chapter 7 contain datasets for you to analyse, using hypothesis tests and credible intervals. You will need a computer for these, to calculate probabilities numerically and to plot graphs.

  On hypothesis tests: exercises **7.3**, **7.4**.

  On credible intervals: exercises **7.5** (which provides example code), **7.6**, **7.7**(a).

- Exercise **8.1** provides example code for the Metropolis-Hastings algorithm, and invites you to experiment with the effects of changing several parameters.

  Exercise **8.2** asks you to use this same example code to sample from the posterior in a Bayesian inference problem.

In case you do finish the exercises or have already done them outside of class time, on the course materials page you can find an (entirely optional) ⋆⋆⋆ extension exercise about multi-expert elicitation.